Benutzerhandbuch

Vorwahlzähler

User Manual

Preset Counter

Signo 721.2/.3/.4

Deutsch

English

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1 General Information

1.1 Information about the Operating Instructions

These operating instructions provide important information about the handling of the counter. To ensure safe operation it is vital that the safety information and instructions are strictly observed.

The counter has been designed for industrial use and for installation in machinery or industrial plants.

The manufacturer of the machine/plant in which the counter is used has to ensure that the function of the counter is properly described in the Operating Instructions of the machine or plant, and that the description is in accordance with manufacturer's programming functions.

The manufacturer's safety rules shall be applicable.

In addition, the regulations concerning the prevention of accidents and general safety information shall be adhered to.

Before starting any work on the machine/plant, the operating instructions and in particular, the Safety chapter and the respective safety information must be fully read and considered.

These operating instructions are an integral part of the product and must be maintained in the direct vicinity of the machine/plant and in a place that is readily accessible for the operating staff.

These operating instructions contain important information concerning the installation, connection and programming of the counter.

Description of the programming sequence:

- Programming of the function codes
- Programming of the signal times
- Programming of the presettings
- Programming of the prescaleer

Before starting to run the machine/plant is in operation, all functions that are not allowed to be changed by the operator have to be blocked.

The executed programming functions have to be documented.

The counter 0721.2xx / 0721.3xx und 0721.4xx are designed to replace the counter 0721.1xx. See chapter 6.

1.2 Explanation of symbols

Warnings

The warnings in these operating instructions are designated by symbols. Signal words at the beginning of the warnings indicate the severity of a safety hazard.

These notes have to be observed by all means, and all actions have to be taken with utmost care so as to prevent any accidents or damage or personal injury.

Danger!
This warning indicates a direct safety hazard, which may lead to serious injuries or even death if preventative action is not taken.

Warning!
This warning indicates a possible safety hazard, which may lead to serious injuries or even death if preventative action is not taken.

Caution!
This warning indicates a possible safety hazard, which may lead to minor damage or injuries if preventative action is not taken.

Note!
This symbol indicates a potentially hazardous situation, which may lead to damage to property or to the environment if preventative action is not taken.

Tips and recommendations.
This symbol is used to point out to useful tips and recommendations and information ensuring efficient and trouble-free operation.

1.3 Limitation of Liability

The information and notes contained in these operating instructions were gathered in accordance with the applicable standards and regulations, the state-of-the-art, as well our long-standing experience and know-how.

The manufacturer shall not assume any liability for damage caused by:

- Non-adherence to the operating instructions
- Improper use
- Employment of unskilled or untrained personnel
- Makeshift changes or manipulation
- Opening of the multifunction counter

1.4 Copyright protection

The operating instructions must be treated confidentially and used exclusively by the personnel responsible for the setup, maintenance, repair and operation of the machine/plant. Disclosure of these operating instructions to any third parties shall not be permissible without the prior written consent of the manufacturer.

The data and information stated here, including text, drawings, images and other illustrations, are protected by copyrights and subject to industrial property rights. Any misuse of such information shall be subject to prosecution.

1.5 Guarantee conditions

Our guarantee conditions are available for download from our homepage at www.hengstler.com – DOWNLOAD – General Terms & Delivery Terms.

1.6 Customer Service

Our customer service is available to provide technical information and assistance for our customers. Detailed information on your responsible contact partner is given on our homepage (www.hengstler.com) under Contact and Directions.

2 Safety

This section provides an overview of all the important safety-relevant aspects to ensure best possible protection of the operating personnel as well as safe and trouble-free operation. Non-adherence to the instructions given in this manual may result in considerable safety hazards.

2.1 Intended Use (Proper Use)

The counter is exclusively designed and constructed for the intended use and purposes described here.

The counter serves together with a corresponding encoder for the counting of piece numbers, lengths, flow rates, as well as for the controlling and monitoring of machinery and equipment by sending control signals.

Warning!
Safety hazards due to improper use / misuse!
Using the counter for any purposes other than the ones described within the scope of intended use may cause hazardous situations.

Claims for damages resulting from any kind of misuse shall be expressly excluded.

2.2 Assembly, connection, programming

These counters are built and tested in accordance with IEC/EN 61010-1, Protection Class II. They have left the factory in a condition that is in compliance with all safety-relevant requirements.

In order to maintain this condition and ensure operational safety, the User is requested to observe the safety notes and warnings given in these operating instructions.

Danger!
Risk of safety hazards due to incorrect/faulty assembly and connection.

- The max. operating voltages must not be exceeded!
- 12 – 30VDC and 24VAC multifunction counters have to be operated at safety extra-low voltages (SELV) in order to prevent hazardous shock currents
- An external fuse has to be provided to protect the multifunction counter (see Chapter 7, Technical Data).
- Installation and assembly shall be carried out by skilled and trained electricians only.
- Do not connect the counter without making sure that it no longer carries any live voltages. Always separate it from the mains supply before connecting.
- Make sure that live terminals are properly protected against inadvertent contact.

- To ensure proper protection of terminals against hand contact, make sure that the live conductors are properly connected to the terminals.
- Do not establish any connections with non-allocated (“NC”) terminals.
- Counters may only be operated in a properly installed condition.
- If safe operation seems to be impaired, make the counter inoperable and secure it against inadvertent operation.
- The installation and wiring environment has considerable impact on the electromagnetic compatibility of the counter. Therefore, electromagnetic compatibility of the entire plant has to be ensured during the installation.
- The fabricator of these complete units or systems takes responsibility for conforming to theCE Directive.
- In areas presenting the risk of ESD (electrostatic discharge), make sure to use ESD-protected plugs and switches during the installation.
- If the functions “prescaler input”, “preset input”, “correction value” and “key reset” are not allowed to be used by the machine/plant operator, access to these functions must be blocked for machine operators. Depending on the machine/plant design or concept, non-permissible input may impair the operational safety and function of the machine or plant.
- In oily environments a delamination of the front sheet is possible. Therewith the tightness of the counter may be affected. We suggest to use a protection cover as a countermeasure (see chapter 7, 9 and 14).

- It has to be ensured, that during transient processes (approx. 2 s till the display test disappears) and power down processes no counting pulses or control signals are applied to ensure, that misinterpretations of the logic do not happen.

  After an unplanned power drop adequate actions may be necessary. (E.g. Going back to the reference point)

  If the supply voltage drops below 9 V when switching off the device or due a power breakdown, all outputs are switched off immediately

Gefahr:
Der Hersteller der Steuerung / Anlage hat sicherzustellen, dass sich hieraus keine Risiken ergeben.

- The machine/plant manufacturer shall be responsible for the preparation of operating instructions / plant description including the following:

o Description of functions according to the programming of the counter;

o Description of the settings to be adjusted by the machine/plant operator;

o Information concerning the occupational safety requirements and possible hazards arising from the operation of the machine/plant.

2.3 Responsibilities of the machine/plant manufacturer and operator

Counters are designed for installation in machines/plants. Therefore, the manufacturer and operator of the machine/plant are subject to the legal obligations concerning occupational safety and health.

Besides the safety notes given in these operating instructions, the relevant rules and regulations concerning safety and the prevention of accidents, and the applicable environmental requirements have to be met. In particular:

- The machine/plant manufacturer shall be obligated to ensure that all the requirements mentioned in Section 2.2 be fulfilled during the assembly, connection and programming.

- The operator shall obtain all the required information about the applicable occupational safety rules. In addition, the operator shall be obligated to prepare a risk assessment of possible hazards that may arise due to the special working conditions at the place of installation of the machine/plant. This risk assessment shall be documented in the form of operating instructions for the machine/plant.

- Throughout the entire operating time of the machine/plant the operator shall be obligated to check if the operating instructions prepared are in accordance with the latest status of requirements and, if required, make the appropriate adjustments.

- The operator shall ensure that all staff members who are involved in the machine/plant operation have read and fully understood these instructions. Moreover, the operator shall be obligated to train the operating per sonnel at regular intervals and inform them about any potential hazards.

- The operator shall ensure that the operation and cleaning of the machine/plant is exclusively carried out by skilled and trained personnel.
- The operator shall ensure that all maintenance and repair work shall only be carried out by skilled and trained personnel.

2.4 Staff-related requirements

Warning:
Danger of personal injuries if handled by insufficiently qualified staff!
Improper handling may cause severe personal injuries and damage to property.

- Actions requiring special skills have to be carried out only by the personnel designated in the appropriate sections of these instructions.
- Keep unqualified personnel away from hazard areas.

The following staff qualification requirements have been defined for the various scopes of activities:

- **Instructed personnel**
  These persons have been instructed by the operator with regard to the tasks assigned and the potential hazards caused by improper handling.

- **Skilled personnel**
  Due to their educational and professional skills, know-how and experience, as well as due to their knowledge of the relevant regulations, these persons are capable of executing their assigned tasks and recognize potential hazards independently.

- **Skilled and trained electricians**
  Due to their educational and professional skills, know-how and experience, and due to their knowledge of the relevant regulations in the field of electrical engineering, these persons are capable of executing electrical work and recognizing potential hazards independently.

2.5 Special hazards

This section indicates certain residual risks, which may arise as a result of the risk assessment.

The safety information and warnings given here and in the following chapters of these instructions have to be observed in order to reduce any health hazards and avoid hazardous situations.

Danger!

Lethal hazard of shock current and electric shock!
Any contact with hazardous live components presents a direct lethal hazard. Damages of the insulation or individual components present a potential lethal hazard.

- **In the event of any damage to the insulation, immediately disconnect the voltage supply and initiate the appropriate repair work.**
- **Any work on the electrical plant has to be carried out by skilled and trained electricians only.**
- **Before commencing your work on the electrical system, disconnect it from the mains supply and check that it no longer carries any live voltages.**
- **Prior to conducting any maintenance, cleaning or repair work, disconnect the mains supply and secure it against inadvertent switching on.**
- **Do not short-circuit or make fuses inoperable.**

2.6 Safety devices

Warning!
Lethal hazard by non-functional safety devices!
Safety devices are provided to ensure a maximum of operational safety.

The counter itself does not include any installed safety devices.
These safety devices have to be attached externally.

Protect the electrical supply of the counter by means of external fuses (see Chapter 7, Technical Data).

3 Setup and Operation

1 Display

2 Operating keys

3 Flat gasket

4 Bracket

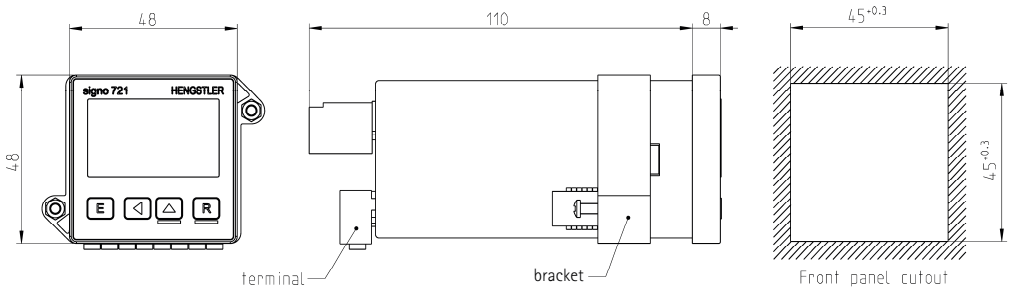
5 Enclosure

6 Plug for DC or sensor supply;
Electronic inputs and outputs

7 Connection terminal
AC supply and relay contacts

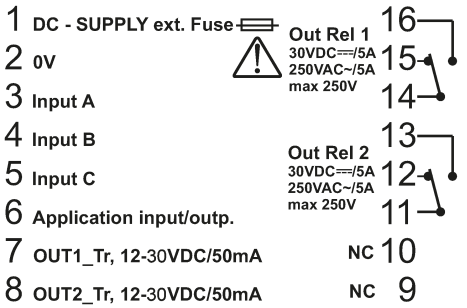
8 Circuit diagram

3.1 Dimension Sheet / Installation of Multifunction Counter



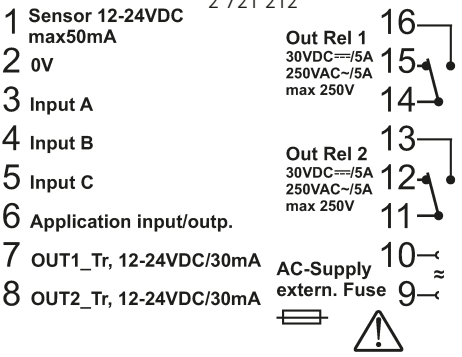
3.2 Connecting the Counter

2 721 209

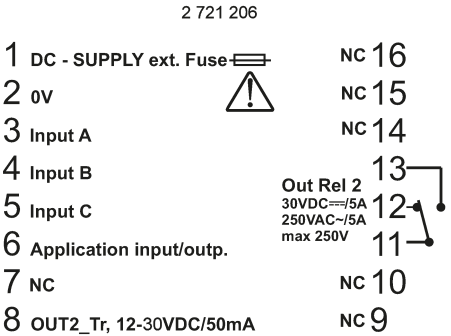


VDC 2 relays / 2 transistors

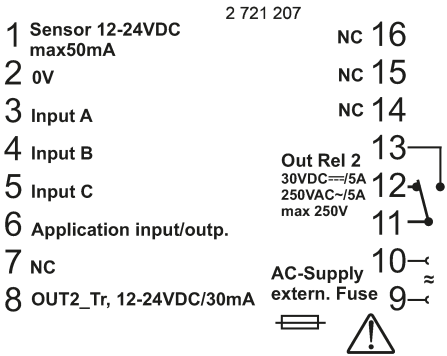
2 721 212



VAC Transformer 2 relays / 2 transistors



VDC 1 relay / 1 transistor



VAC Transformer 1 relay / 1 transistor

English

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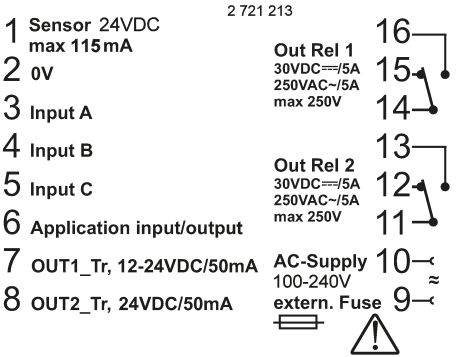
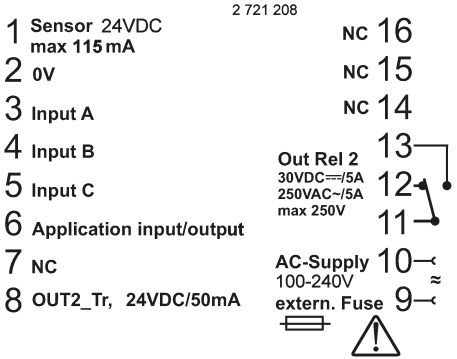


VAC switching power supply 2 relays / 2 transistors



VAC switching power supply 1 relay / 1 transistor

The plug has to be disconnected from the counter before the cables are fastened by means of screws or screw-type terminals.

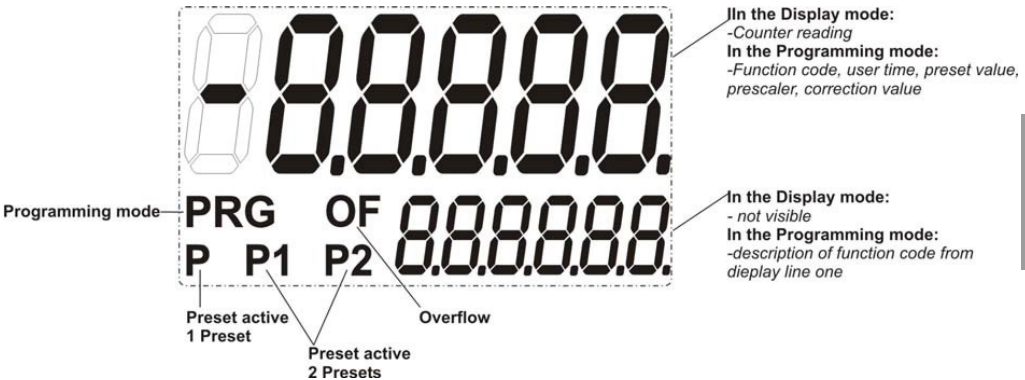
Caution!
It is not allowed to contact the encoder to a direct current line voltage without protective circuit for EMC. For cable lenths > 30 m a protective circuit is always necessary!
When programming the input level to TTL an additional protective circuit is necessary.
We recommend the installation in a metallic environment.

3.3 Display

After switching on, all segments and characters are illuminated for approx. 2 seconds; then the display changes over to the Display or Programming Mode.

The display is available in three different versions:
Reflective: black digits on a bright reflecting background
Positively transflective: black digits on an illuminated background*
Negatively transmissive: red illuminated digits on a black background*

* Currently not available


In the Display mode:
-Counter reading
In the Programming mode:
-Function code, user time, preset value, prescaler, correction value
Programming mode
PRG
OF
P
P1
P2
In the Display mode:
- not visible
In the Programming mode:
-description of function code from dieplay line one
Preset active
1 Preset
Overflow
Preset active
2 Presets

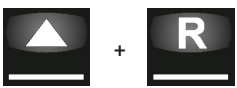
3.4 Keyboard functions

Signo 721 is equipped with four keys:

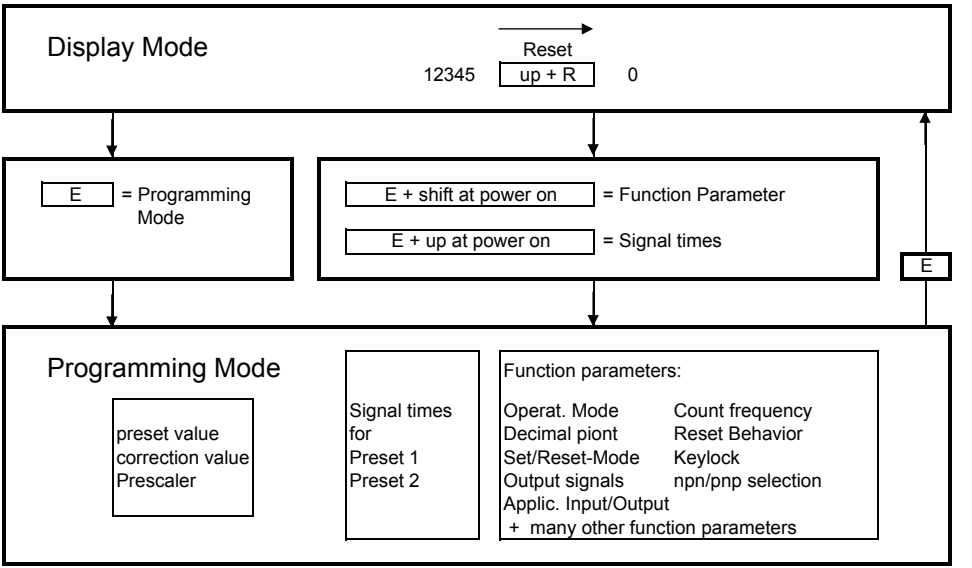
Enter – Button	SHIFT – Button	UP – Button	Reset – Button
These keys are assigned different context-dependent functions.			

If pressed together with POWER ON (keep keys pressed and switch on the device):

	Programming function codes
	Programming mono-time

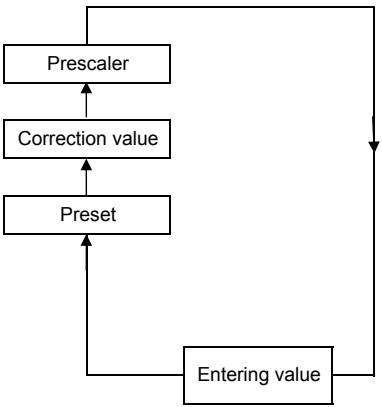
During Operation:	
	For setting the presets, prescaler and correction values. Which each pressing of the ENTER-Button, you will get to the next value.
	When using the SHIFT-Button while setting the values, the next digit to the left is selected.
	When using the UP-Button while programming, the value is raised by one.
	When pressing the UP-Button and the RESET-Button at once, the value is reset. In the setting menu, the current value is set to 0 and the prescaler to 1,0000. When in the programming mode for function codes, by pressing these two buttons you can switch between text and numerical display.

3.5 Overview of Operating Elements



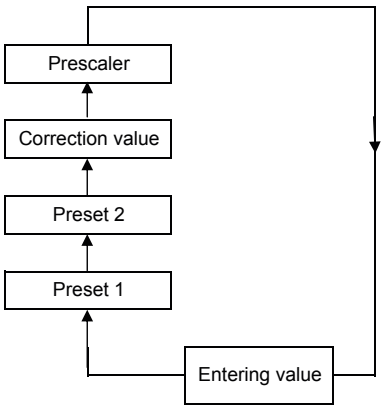
4.1 Overview of programming the presets, correction values and prescaler

Counter with preset



The first programmable value is always the preset

Counter with 2 presets



The first programmable value is always the preset 1

4.2 Programming presets, correction value and prescaler

By pressing the E-button you get to the setting of presets, correction value and prescaler. With every pressing of the E-button you will get to the next settable value. If passed through all values, the next pressing of the E-button saves all values and the counter returns to the display mode.

In the programming mode the selected digit can be changed by using the SHIFT-button. Each time pressing the shift button the digit one to the left is selected. With the UP-button the value of the selected digit is raised by one.
Presets and correction values can be positive or negative. The prescaler value can only be positive.

If the fifth digit is changed from 9 to 0 the leading sign is changed.

If presets, correction values or prescaler are locked with F31-F36, these will not be shown.

When setting the correction value, first the counting value is on the display. This value can be changed and will be saved when returning to the display mode.

When leaving the programming mode, presets and correction value will be checked if the set values are able to reach. This is necessary as with a prescaler > 1 not all values can be reached.
Presets and correction values will be rounded to the next available value.

If in the programming mode no button is used for 16 seconds, the counter returns to the display mode.
The values which have been saved by then will be kept.

Pressing the UP- and the R-button at the same time the preset and correction value will be set to 0, the prescaler to 1,0000.

Switching to the programming mode, switching to the next value

Selecting the digit: (blinking)

Raise value by one

After run through all values: Save and back to display mode

Preset and correction values reset to 0
Prescaler set to 1,0000

Preset 1

Preset 2

Preset (at a preset)

Correction value

Prescaler

English

4.3 Setting the signal times

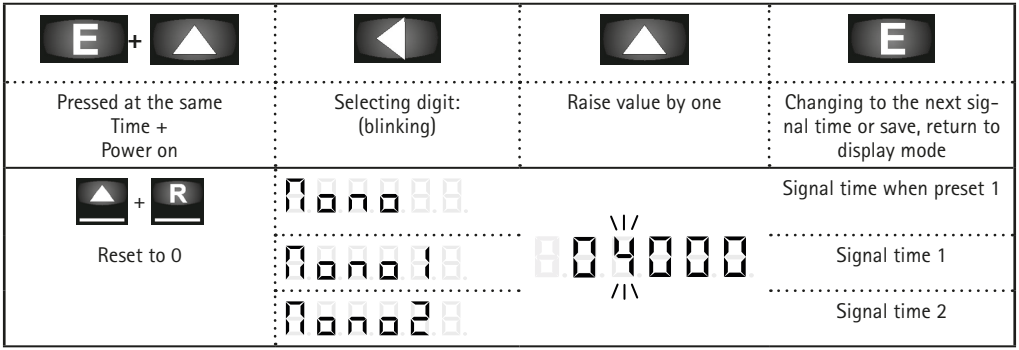
If with the function codes F7 and/or F8 an output signal is set to monostabil, the following programming sets the signal time. You get to the programming mode by pressing the buttons E + UP while switching on the counter.

In the programming mode, the digit that you want to change is selected by the SHIFT-button. This digit is blinking. With each pressing of the SHIFT-button, the selected digit is going one position to the left. With the UP-button the value of the selected digit is raised by one.

The maximum settable time is 599,99 s.

By pressing the E-button the counter switches to the setting of the next signal time. Pressing the E-button again saves the set values and returns to the display mode. For counters with one relay, only one signal time is possible to set.

Pressing UP- and R-button at the same time, the value is set to zero.


E +
Pressed at the same Time + Power on
Selecting digit: (blinking)
Raise value by one
E
Changing to the next signal time or save, return to display mode
R
Reset to 0
Mono
Mono1
Mono2
04000
Signal time when preset 1
Signal time 1
Signal time 2

English

5 Describtion of the counter

5.1 Describtion of the counter

Factory Setting (Defaults):	Sets all the function codes to the factory settings, i.e. all codes designated with *.
Counter mode:	The following counter modes can be selected: Unidirectional counting, adding or subtracting; Unidirectional counting with directional input; Differential counting, summation (totalizing) or phase discriminator (quad) with single, double or quadruple evaluation.
Prescaler:	The "Prescaler" is a multiplier. Each input pulse is multiplied by the adjusted factor. The display shows integers only. After a reset the counter is completely reset to 0; this also includes the non-visible value of < 1. At a prescaler of >1 not all the values are selectable. If invalid Preset values are selected, the counter will round them up to the next possible value. Example: PSC cannot select (reach) Preset value 7. In this case, the counter automatically changes the Preset value to 10). If the Prescaler is changed, this may also affect the Preset values, which may have to be changed accordingly. Adjusting range 0,0001 to 9,9999 The Prescaler is used, for example, to convert counter pulses into meaningful units, to adapt the units of measurements (e.g. cm-pulses to inch-pulses), or to compensate for worn measuring wheels.

	Formula: PSC = Desired (nominal) display / number of pulses Example: Flowmeter 173 pulses per100 liters; display in liters PSC = 100 / 173 = 0,5780 Example: 1 pulse per cm; display in inch PSC = 1 / 2,54 = 0,3937
Display 2nd row:	In display mode, the second display line is not used. In the programming mode the function codes, presets, correction values, prescaler or signal times, which are programmed in the first display line, are shown in the 2nd display line.
Counter and control inputs:	The counter is fitted with 3 counter and control inputs and, in addition, with an application input (see below). These inputs are assigned various counter or control functions by means of function code settings.
Input logic:	The input logic can be programmed to NPN or PNP, each at the 8V-level or TTL level; see Technical Data for the switching threshold.
Reset/Set:	Manual setting via keys (lockable) Electronic setting via control input (and/or application input) Automatic programming after reaching the main Preset Depending on the function code the counter is: **1.) Reset:** reset to 0 P 2 is the main Preset (preselect) value During unidirectional counting the counter will add up

	or **2.) Set:** reset to P 2 Signal 2 at 0 During unidirectional counting the counter will subtract	
Static/dynamic Reset:	Static Reset:	Reset over the entire pulse width of the reset pulse
	Dynamic Reset:	Reset via the active edge; thereafter, counter operation is possible independently of the pulse width of the reset pulse.
Decimal point:	The decimal point is only an optical reading aid on the display and does not change the value. For example, for a value of 1 pulse per cm, the setting 0,00 makes it easier to read the value in m and cm.	
Input damping (Attenuation)	The inputs A and B are damped to 60 kHz. Following maximum input frequencies are not to be exceeded: Phasediscriminator single evaluation: A and B each 30 kHz (TTL 20 kHz) Phasediscriminator double evaluation: A and B each 30 kHz (TTL 20 kHz) Phasediscriminator quadruple evaluation: A and B each 15 kHz (TTL 20 kHz) Unidirectional counting and directional input: Input A 60 kHz (TTL 20 kHz) Differential counting, summation (totalizing): Input A + B 60 kHz in total (TTL 20 kHz) If mechanical contacts are triggered (i.e. relays, switches, Reed contacts, etc.), the input frequency has to be damped (attenuated) to 30 Hz, so as to filter out bounce pulses. If damping to 30 Hz is selected, all inputs can be used with 30 Hz.	

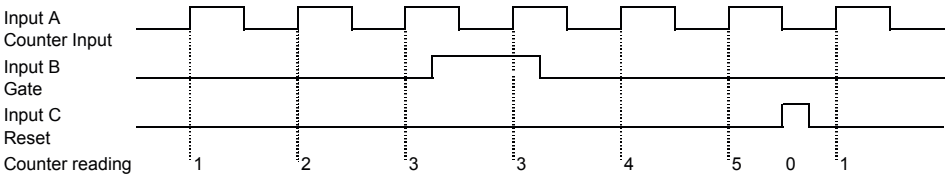
	To reach these values the amplitude thresholds are to be hold. (See technical data - chapter 7)
Signals:	The counter operates in the coincidence mode, i.e. output signals are activated after reaching the appropriate Preset value for the programmed period of time. P 1 and P 2 are available as relay changeover contacts and electronic output signals (PNP). If a signal is active, this will be shown on the LCD display.
Signal times:	1.) bistable: Cleared by electronic or manual reset. P 1= bistable – additionally cleared by signal 2 Attention: Signal 2 must not be bistable for automatic reset. 2.) monostabil: Signal times can be programmed between 0,01s und 599,99s (see chapter 4.3)
Correction value	By selecting the menu item „Correction" the current counter value can be corrected or changed to every possible value.
Application Input/ Output:	6 different functions can be assigned to the application input/output. Note that only one of these functions can be selected. Outputs: Prescaler-output, directional output Input: Reset, Gate, Keylock, Hold

Prescaler output:	The prescaler output is an application output. With each increase of the counter reading the number of output pulses corresponds to the respective number of increments. The pulse length of the prescaler output corresponds to a frequency of1,5 kHz. When using the prescaler output the max. count frequency is: F max = 1500 / PSC. So it is possible that the maximum input frequency can not be reached.
Application Keylock:	All keyboard functions can be locked (latched) individually (Reset, Preset 1, Preset 2, Prescaler, correction value) Lock mode: complete keylock or Keylock depending on keylock-input (application input)

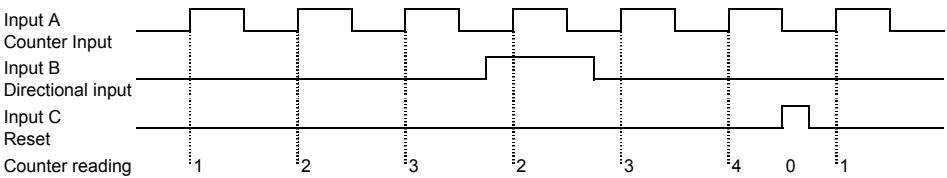
Our Tip:
After setting up the system, lock all the keyboard functions that are not allowed to be changed by the user.

5.2 Signal Diagrams Input signals (PNP-Logic)

Unidirectional counting (F1 = C G r)



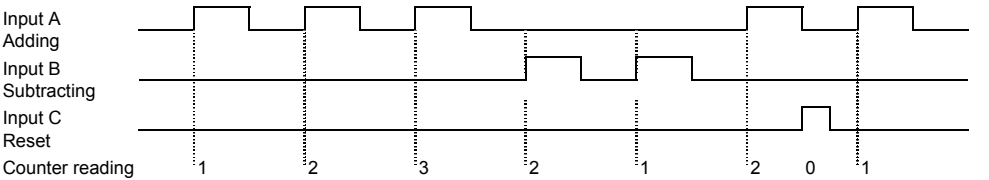
Directional input (F1= C d r)



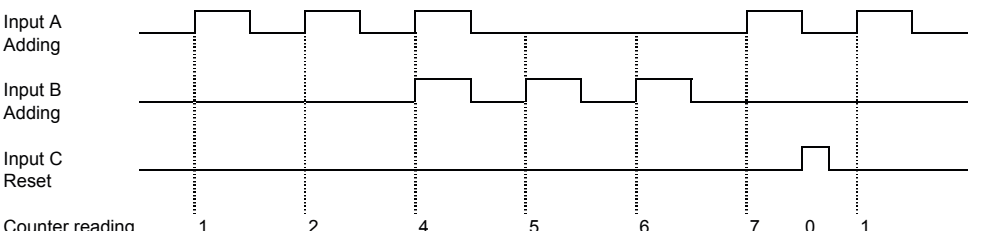
English

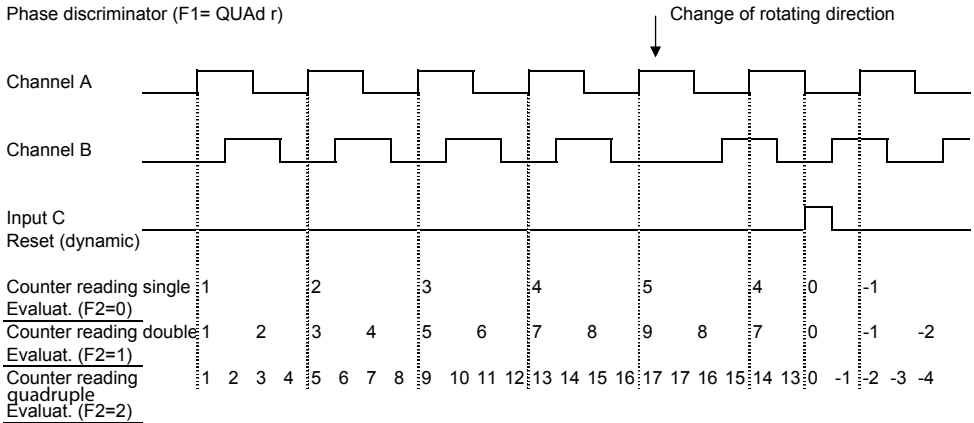
HENGSTLER

Differential input (F1= A S r)



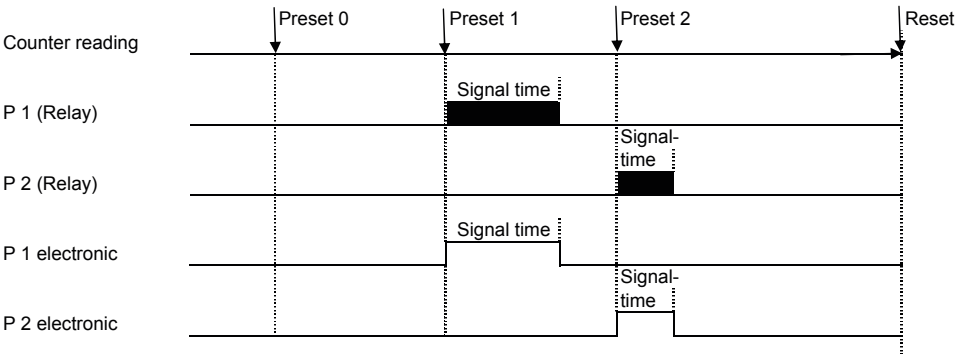
Summation (totalizer) input (F1= A A r)



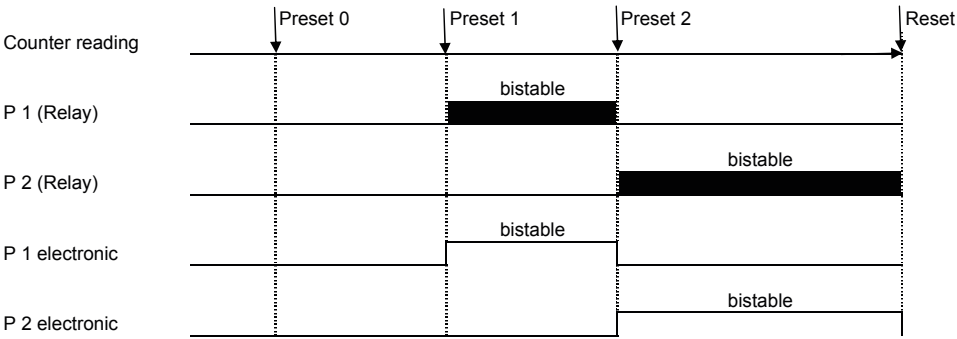

Phase discriminator (F1= QUAd r)
Change of rotating direction
Channel A
Channel B
Input C
Reset (dynamic)
Counter reading single
Evaluat. (F2=0)
1 2 3 4 5 4 0 -1
Counter reading double
Evaluat. (F2=1)
1 2 3 4 5 6 7 8 9 8 7 0 -1 -2
Counter reading quadruple
Evaluat. (F2=2)
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 17 16 15 14 13 0 -1 -2 -3 -4

5.3 Signal Diagrams - Output signals

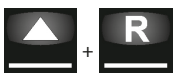
Output signals monostable
Coincidence signals P 1 (F7), P 2 (F8) monostable



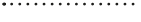
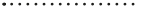
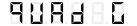
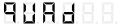
Output signals bistable
Coincidence signal time P 1 (F7), P 2 (F8) bistable



5.4 Programming the Counter Function Codes

Programming Mode:	Change Function Setting:	Change to next function:	Return to Display Mode and save the set function values:
Keep pressed and simultaneously turn Voltage On	press	press	press
Alternative display of the function codes		The function codes are displayed as text in row 1. By pressing both keys simultaneously you can change to the numerical display (F 0 to F 35). After pressing these keys once again the number of the selectable options will be displayed in addition. This setting will be stored.	

Functions-code	Display Row 1	Function	No.	Display Row 2			
F0	FCESEt	Factory Setting (Defaults)	0*	no	No Function		
			1	YES	All Function Codes are set to the values marked with *		
					Input A	Input B	Input C
F1	CounE	Zählbe-triebsart	0*	CGr	Count. Inpt.	Gate	Reset
			1	Cdr	Count. Inpt.	Direction. Input	Reset
			2	CHr	Count. Inpt.	Hold	Reset
			3	CdG	Count. Inpt.	Direction.	Gate
			4	ASr	Adding	Input	Reset
			5	ASG	Adding	Subtracting	Gate

			6		Adding	Adding	Reset
			7		Channel A	Channel B	Reset
			8		Channel A	Channel B	Gate
F2		Edge Evaluation / Quadrat. evaluation	0*		Single evaluation		
			1		Double evaluation		
			2		Quadruple evaluation		
F3		PNP/NPN-Logic	0		NPN 8 V-Level		
			1*		PNP 8 V-Level		
			2		NPN TTL-Level		

			3	PNP_L	PNP TTL-Level
F4	In AtE	Input-damping (Attenu-ation)	0	Lo Fr9	30 Hz damping (e.g. for mechanical contacts)
			1*	Hi Fr9	F max. (see chapter 4 and 7)
F5	FS Mod	Set / Reset - Mode	0*	rES 0	Reset to 0
			1	ArES 0	Automatic reset to 0 after reaching Preset 2
			2	SEt P2	Set to Preset 2
			3	ASEtP2	Automatic reset to Preset 2 after reaching 0
F6	FESEt	Dynam/ static Re-set	0*	StAt	Static reset (reset as long as the signal is applied)
			1	dyn	Dynamic Reset (ready to count after reset (even if reset signal is applied for a longer time)

F7		Signal time P 1	0		Disabled / No output signal
			1		Bistable, reset with Preset 2 or Reset
			2		Monostable setting (0-599,99 s)
F8		Signalzeit VW 2	0		Disabled / No output signal
			1		Bistable; Reset Cannot be used in conjunction with automatic Reset
			2		Monostable setting (0-599,99 s)
F9		Decimal point	0*		No decimal point
			1		1 decimal place
			2		2 decimal places

			3	0.000	3 decimal places
			4	0.0000	4 decimal places
F20	APL inP	Applica. Input/ Output	0	PSCout	Prescaler output
			1	dirOut	Directional output
			2	rESEt	Reset input
			3	GAtE	Gate input
			4*	Loc	Keylock input
			5	HoLd	Hold input (display lock)
F30	rESLoc	Lock Reset key	0*	unLoc	Enable keyboard reset

			1		Keyboard reset locked
F32		Lock Preset 1	0*		P 1 Setting enabled
			1		P 1 Setting locked
F33		Lock Preset 2	0*		P 2 Setting enabled
			1		P 2 Setting locked
F34		Lock Prescaler	0*		PSC setting enabled
			1		PSC Setting locked
F35		Lock correction value setting	0*		Correction value setting enabled
			1		Correction value setting locked

F36	GLobAL	Lock Mode	0*	Loc'd	Completely locked
			1	InPLoc	Lock depends on Keylock Input

English

6.1 Replacing the 0721.1 with 0721.2, .3 or .4

The counter 0721.2, .3 and .4 replaces the old counter 0712.1. They only differ as to their displays.

The counter is designed with completely new hardware. Therefore the wiring of the plug type connectors changed as well. For more information on these changes please see chapter 6.2

For the power supply has to be considered:
The connections for the DC supply are still 1 and 2. But they have been changed among each other.
New is, that now 10 = +UB and 2= 0V
The AC- power supply is connected to 9 and 10.

Danger!
Under no circumstances, the connector with the old wiring is allowed to be plugged to the new counter. A wrong connection may lead to dangerous situations, extensive material damage and the destroying of the counter.

There are different ways for connecting the control inputs. For an optimum selection all needed control-functions have to be considered. There are now new combinations available which were not possible before. There are also combinations which are not possible, e.g. the prescaler output together with the keylock input. If the buttons have to be locked this has to be done via the software. The keylock-input is only needed if the keylock has to be controlled from the outside.

The switch-settings are replaced by the function codes, which have to be programmed correspondingly (see chapter 5.3 and chapter 6.3)

The potentiometer settings are replaced by setting the function codes F7 and F8 to bistabil and monostabil (see chapter 5.3) and if needed, the programming of the signal times (see chapter 4.3).
The handling of the counter by the operator of the machine doesn't change.

6.2 Changes on wiring at the plug-type connectors

6.2.1. Version: 1 Preset with relay-output

	old		new	alternative displays
	0 721 101		0 721 201	07213**xx** reflective
	0 721 102		0 721 202	07214**xx** backlighted
	0 721 109		0 721 202	
	0 721 121		0 721 201	
	0 721 122		0 721 202	
	Plug-type connector	**Function**	**Plug-type connector**	**Function code setting**
Power supply DC or AC	1	Power supply DC-suppl. 0 V	2	
		AC-suppl. ~	9	
	2	Power supply DC-suppl. + Ub	1	
		AC-suppl ~	10	

	3	not used		
	4	not used		
	5	not used		
Relay	6	Normally closed	12	
	7	Center contact	11	
	8	Normally open	13	
Sensor supply	9	0 V sensor supply	2	
	10	24 VDC sensor supply	1	
Control inputs	11	Count-input	3	F1 = 0, 1, 2, 3, 4, 5, 6
	12	Reset	5	F1 = 0, 1, 2, 4, 6,
		Reset at application input	6	F20=2
	13	Application input		
		as Gate	4	F1 = 0
			5	F1 = 3, 5
			6	F20 = 3
		As Hold	4	F1 = 2

English

			6	F20 = 5
		as directional input (Up/Down)	4	F1 = 1, 3
	14	Keylock	6	F20 = 4 select in F30 - F35 F36 = 2
PSC-output.	15	Prescaler-output	6	F20 = 0
	16	not used		

6.2.2. Version: 1 Preset with transistor-output

	old		new	alternative displays
	0 721 103		0 721 201	07213**xx** reflectiv
	0 721 104		0 721 202	07214**xx** backlighted
	Plug-type connector	**Function**	**Plug-type connector**	**Function code setting**
Power supply DC or AC	1	Power supply DC-suppl. 0 V AC-suppl. ~	2 9	
	2	Power supply DC-Vers. + Ub AC-suppl. ~	1 10	
	3	not used		
	4	not used		
0V	5	0V	2	

English

	6	not used		
Transistor output	7	Out Transistor	8	
	8	0 V	2	
Sensor supply	9	0 V sensor supply	2	
	10	24 VDC sensor supply	1	
Control inputs	11	count input	3	F1 = 0, 1, 2, 3, 4, 5, 6
	12	Reset	5	F1 = 0, 1, 2, 4, 6,
		Reset at application input	6	F20=2
	13	Application input		
		as Gate	4	F1 = 0
			5	F1 = 3, 5
			6	F20 = 3
		As Hold	4	F1 = 2
			6	F20 = 5
		as directional input (Up/Down)	4	F1 = 1, 3

	14	Keylock	6	F20 = 4 select in F30 - F35 F36 = 2
PSC-output	15	Prescaler-output	6	F20 = 0
	16	not used		

6.2.3. Version: 2 Presets with relay-output

	old		new	alternative displays
	0 721 105		0 721 205	07213**xx** reflective
	0 721 106		0 721 206	07214**xx** backlighted
	0 721 110		0 721 210	
	0 721 125		0 721 205	
	0 721 126		0 721 206	
	Plug-type connector	**Function**	**Plug-type connector**	**Function code setting**
Power supply DC or AC	1	Power supply DC-suppl. 0 V AC-suppl. ~	2 9	
	2	Power supply DC-suppl. + Ub AC-suppl. ~	1 10	
	3	not used		

Relay 1	4	Center - contact	14	
	5	Normally open	16	
	6	not used		
Relay 2	7	Center contact	11	
	8	Normally open	13	
Sensor supply	9	0 V sensor supply	2	
	10	24 VDC sensor supply	1	
Control inputs	11	Count input	3	F1 = 0, 1, 2, 3, 4, 5, 6
	12	Reset	5	F1 = 0, 1, 2, 4, 6,
		Reset at application input	6	F20=2
	13	Application input		
		as Gate	4	F1 = 0
			5	F1 = 3, 5
			6	F20 = 3
		As Hold	4	F1 = 2
			6	F20 = 5

English

		as directional input (Up/Down)	4	F1 = 1, 3
	14	Keylock	6	F20 = 4 select inF30 - F35 F36 = 2
PSC-output	15	Prescaler-output	6	F20 = 0
	16	not used		

6.2.4. Version: 2 Presets with transistor-output

	old		new	alternative displays
	0 721 107		0 721 205	07213**xx** reflectiv
	0 721 108		0 721 206	07214**xx** backlighted
	Plug-type connector	**Function**	**Plug-type connector**	**Function code setting**
Power supply DC or AC	1	Power supply DC-suppl. 0 V	2	
		AC-suppl ~	9	
	2	Power supply DC-suppl. + Ub	1	
		AC-supply ~	10	
	3	not used		
Transistor output 1	4	Out 1 Transistor	7	
	5	0V	2	

	6	not used		
Transistor output2	7	Out 2 Transistor	8	
	8	0V	2	
Sensor supply	9	0 V Sensorsupply	2	
	10	24 VDC Sensorsupply	1	
Control inputs	11	count input	3	F1 = 0, 1, 2, 3, 4, 5, 6
	12	Reset	5	F1 = 0, 1, 2, 4, 6,
		Reset at application input	6	F20=2
	13	Application input		
		as Gate	4	F1 = 0
			5	F1 = 3, 5
			6	F20 = 3
		As Hold	4	F1 = 2
			6	F20 = 5
		as directional input (Up/Down)	4	F1 = 1, 3

	14	Keylock	6	F20 = 4 select in F30 - F35 F36 = 2
PSC-out.	15	Prescaler-output	6	F20 = 0
	16	not used		

6.3 Changes on switch- and potentiometersettings

Switches	Function 0721.1xx	Functions codes see chapter 5.3	Comment
1	Input npn - pnp	F3	
2	Gate at application input	F1 = 0, 3, 5, oder F20 = 3	Gate is available at Input B,C or application input. Function codes F1 or F20 have to be programmed correspondingly.
3	Hold at the application input	F1 = 2 oder F20 = 5	Hold is available at Input B or application input. Function codes F1 or F20 have to be programmed correspondingly.
4	Damping 5 kHz / 30 Hz	F4	new 60 kHz / 30 Hz (see techn. data chapter 7)
5 6 7	Lock keyboard reset Keyboard lock Key 1 Keyboard lock Key 2	Auswahl mit F30-F35 F36 = Sperrmodus	With the function codes F30-F35 reset, presets, prescaler and correction values can be locked seperately. With F36 it is programmed wether the locking is total or corresponding to the aplication input.

8 9	Automatic reset Reset / Set	F5	The setting of both switches are replaced by the set-tingof F5

Potentiometer

	Signal time out 2 setting to 0,05 – 1s or bistable	F7 and F8 Signal times see chapter 4.3	With F7 and F8 a monostabil or bistabile output signal can be selected.If a monostabil signal is selected (see chapter 2.3) the signal times have to be set between 0,01 to 599,99.

7 Technical Data

General

Display	LCD reflective; positively transflective; black digits; background illumination* negatively transmissive; red digits; illumination* 2 rows, counter reading/presettings 5-digits decimal point (up to 4 decimals)
View angle	12 o'clock
Height of digits	1st row 12,0 mm; 2nd row 6,0 mm
Supply voltage	SELV: 12-30 VDC; protected against polarity reversal SELV: 24 VAC, 50/60 Hz, ±10% 115/230 VAC, 50/60 Hz, ±10% 100-240 VAC; 50/60 Hz, ±10%
Current consumption	12 ... 30 VDC: < 200 mA, 24 VAC < 250 mA; including sensor supply 115/230 VAC, 50/60 Hz < 50 mA incl. sensor supply 100-240 VAC < 80 mA; incl. sensor supply at 90 VAC
Power consumption	< 5 W < 8 W (switch-mode power supply)

Duty cycle	100%
Overload protection	external fuse DC: 0,16 AT (IEC 127); DC: 0,2 AT (UL 198) 24 VAC: 315 mAT 230 VAC: 32 mAT; 115 VAC: 63 mA T 100-240 VAC (switch-mode power supply), 630mAT/250V G-fuse plug
Overload protection Relay output	external fuse 230 V, 2,5 mA T
Sensor supply	24/115/230 VAC AC-operation: 12-24 VDC (load dependent), max. 50 mA 100-240 VAC (switching power supply) AC-operation: 24VDC/-5%, max. 115 mA max. capacitive load = 470 µF
Storage of values	NV-memory > 10 years
Electrical connections	Plug-in screw-type connections / Terminals
Cable cross-section	1...1.5 mm² with wire-end sleeves
Amplitude threshold	< 2 V and > 8 V or < 1 V and > 4 V at TTL-level amplitude max. 40 VDC
Active edge	programmable, positive for PNP-input, negativ for NPN-input

Pulse form	any desired form (at max. frequency square 1:1)
Input resistance	approx 10 kOhm
Clock frequency	max. 60 kHz (TTL 20 kHz): single-channel counting max. 60 kHz (TTL 20 kHz): Differential counting and totalizing channel (A+B together) max. 30 kHz (TTL 20 kHz): phase discriminator single or double evaluation max. 15 kHz (TTL 15 kHz): phase discriminator, quadruple evaluation damped (attenuated) 30 Hz *-> Please pay attention to graphics on page 158*
Pulse duration min.	17 ms (30 Hz); 8 µs (60 kHz)
Prescaler	0,0001 - 9,9999
Reset	manual reset via keyboard, external reset via static or dynamic programming; pulse length min. 5 ms, automatic reset after reaching Preselect 2, (No pulse losses at max. counter frequency due to automatic reset function). via application input (programmable)
Display and Preset Range	- 99 999 up to + 99 999
Signal times	0,01 s to 599,99 s or bistable programming; tolerance + 10 ms

Relay Output	Preset 1 und 2 Change-over contact max.: 250 VAC / 30 VDC / 5 A Change-over contact min.: 5 VAC / 5 VDC / 10 mA delay < 10 ms
Transistor Output	Preset 1 und 2 PNP-output 12 - 30 VDC max. 50 mA for DC supply 12 - 24 VDC max. 30 mA for AC supply 24 VDC max. 50 mA for AC with switching power supply
Application Output	PNP output 12 - 30 VDC max. 20 mA at DC supply 12 - 24 VDC max. 20 mA at AC supply 24 VDC max. 20 mA at AC with switching powersupply

Counter

Counter mode of operation Input A,B	Unidirectional; adding or subtracting; directional input; Differential operation, add / sub; Summation (Totalizing) add / add; Phase discriminator single, double or quadruple evaluation
Control Input	Reset; Gate, Hold
Application Input/Output	Output Prescaler-out, Direction-out Input: Reset, Gate, Keylock, Hold

Environment. cond. Safety Rules

General design	IEC/EN 61 010-1
Protection Class	II; IEC/EN 61010-1
Pollution degree	2, EN 50178
EMC - Interference immunity	EN 61326-1 industrial environment
EMC - Emission	EN 61326-1 Class B
Ambient temperature	0°... 50°C EN 60 068-2-1/2 0°... 45°C with block assembly 0°... 50°C in single row assembly
Storage temperature	- 20°... + 65°C EN 60 068-2-1/2
Climate	"40°C / 93% rel hum. class 4K4H, EN 60 068-2-78 25 - 50°C / 93% rel hum., cyclic, EN 60 068-2-38"
Degree of protection	"IP 65 front side; EN 60529 IP 20 terminals"
Vibration resistance	10 m/s^2 (10 ... 150 Hz); EN 60 068-2-6
Shock resistance	100 m/s^2 (18 ms); IEC 60 068-2-27
Resistence to chemicals	Frontfoil nach DIN 42 115-2

Approvals	UL, CSA File E 338 588
RoHS	compliant
Reach	compliant

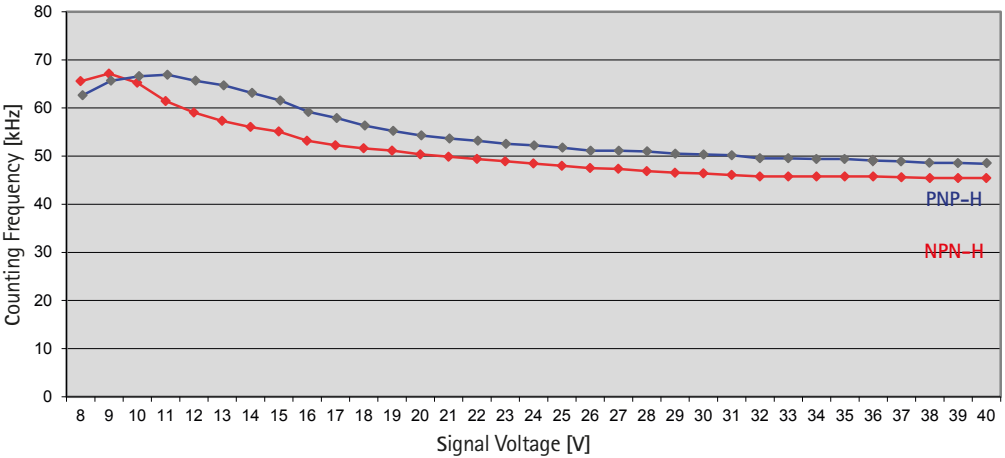
Mechanical Data

Dimensions	48 mm x 48 mm x 118 mm, installation depth 110 mm DIN 43700
Installation	"Front-panel installation with tenter (frame) Front panel thickness max. 11 mm"
Front-panel cutout	45 mm x 45 mm +0,3 mm
Weight	approx. 200 g

* not yet available

** For cable length > 30 m, for connection to a DC-supply- network and input level TTL and additional protection circuit is neccessary.

Counting frequency according to signal voltage - Tico 77x



The counting frequencies were determined by using a signal generator with an output resistance of 50 Ω.

8 Transport, Packaging, Storage

Note!
Damage may be caused by improper transport!
Improper transport may cause considerable damage.
Do not remove the packaging before assembly and installation.

The packaging offers ideal protection against mechanical damage and loss of single parts, such as the plugs or operating instructions. Therefore, do not take the counter out of its packaging until you actually have to start your assembly and installation work.

Inspect the shipment for completeness and possible signs of transport damage immediately after receipt.

9 Maintenance and cleaning

The counter does not require any maintenance.

The front side may be cleaned with commercially available household detergents.

10 Malfunctions

Warning!
Danger of injuries due to improper fault correction!
Improper fault correction may cause serious damage or personal injury.

The machine/plant manufacturer is responsible for the preparation of operating instructions or a description stating the potential errors and the appropriate corrective action, as well as potential hazards and the behavior in the event of malfunctions. This is dependent on the design concept and construction of the machine or plant.

The first step is to determine if the cause of an error or malfunction implies a possible fault of the counter.

10 Malfunctions

Overview of Errors

Error	Possible cause	To be corrected by:
Display remains dark	Machine/plant not powered on	Operator
	Defective voltage supply	Qualified electrician
Counter does not count	Defective signal generator; Counter does not receive any counting signals	Skilled personnel
	Adjusted to incorrect mode of operation (F1) Single-channel, directional input, differential counting, phase discriminator	Skilled personnel
	Incorrect adjustment of PNP/NPN logic and input level (F3)	Skilled personnel
	High-level does not exceed the upper amplitude threshold; low-level does not fall below the lower amplitude threshold	Qualified electrician
Incorrect counting	Continuous reset signal is applied	Qualified electrician
	Continuous gate signal is applied	Qualified electrician

Incorrect counting	Prescaler value is not correct	Skilled personnel
	Phase discriminator - edge evaluation not correctly adjusted (F2)	Skilled personnel
	Input frequency too high (F4)	Skilled personnel
Keyboard Reset not possible	Keys are locked (F30 + F35)	Skilled personnel
Presetting not possible	Keys are locked (F31, F32, F33 + F35)	Skilled personnell
Prescaler adjustment not possible	Keys are locked (F34+ F35)	Skilled personnell
Signal 1 or 2 not received	Signal deactivated (F7, F8)	Skilled personnell
	Signal time adjusted to 0,000	Skilled personnell

11 Spare Parts

Warning!
Danger due to faulty spare parts!

The use of incorrect or faulty spare parts may cause damage, malfunction or even total breakdown and safety hazards. Therefore, please make sure only to use the original spare parts provided by the manufacturer.

The counter may only be opened by the manufacturer.
Exclusively outer components are available as spare parts

The order numbers are given in Chapter 13.

12 Dismantling and Disposal

After reaching the end of its useful life the counter has to be disposed of or recycled according to the applicable environmental protection rules.

13 Ordering Information

Display	presets	12 - 30 VDC	24 VAC	100 - 240 VAC	115 AC	230 AC
LCD transmissive red neg.	1	0 721 201	0 721 209	0 721 202		
LCD transmissive red neg.	2	0 721 205	0 721 210	0 721 206		
LCD reflective	1	0 721 301	0 721 309	0 721 302	0 721 332	0 721 336
LCD reflective	2	0 721 305	0 721 310	0 721 306	0 721 342	0 721 346
LCD transflective neg. white	1	0 721 401	0 721 409	0 721 402		
LCD transflective neg. white	2	0 721 405	0 721 410	0 721 406		

Reflective: black digits on a bright reflecting background
Positively transflective: black digits on an illuminated background
Negatively transmissive: red illuminated digits on a black background

14 Accessories

Adapter front panel	Order no.	Dimensions	Front panel cutout
	1 405 675	60 x 75 mm	55 x 55 mm
	1 405 676	72 x 72 mm	68 x 68 mm
	1 405 679	125 x 60 mm	106 x 55 mm for installation of 2 counters 48 x 48
Protection cover	2 772 052		
Bracket	1 721 004	48 x 48 mm	

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